

PATENT

U.S. Application No.: 10/581,664
Attorney Docket No. 12394/3

Amendments to the Drawings:

The attached sheet of drawings include changes to FIG. 17. This sheet replaces the original sheet. The drawing has been amended to properly identify the prior art status of FIG. 17.

Attachment: Replacement Sheet (1)

REMARKS

I. Status of Claims

Claims 15-27 are pending in the application. Claims 15, 18, and 20 are the independent claims. Claims 18, 20-22, 24, and 25 are currently amended. Support for the additional claim language can at least be found in paragraph [0081] of the instant application as published.

Claim 24 is objected to for having a limitation that lacks proper antecedent basis.

Claims 18-20 and 27 stand rejected under 35 USC 102(b) as allegedly being anticipated by Tomatsu (USP 5,998,268) (“Tomatsu”).

Claims 15-17 are allowed.

Claims 21-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

The Applicant respectfully requests reconsideration of the rejections in view of the foregoing amendments and the following remarks.

II. Drawings

FIG. 17 has been amended to properly identify the prior art status of FIG. 17.

III. Allowable Subject Matter

Claims 15-17 are allowed and claims 21-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

IV. Claim Objection

In view of the foregoing amendment to claim 24, the Applicant respectfully requests withdrawal of this objection.

V. Pending Claims

Independent claims 18 and 20 stand rejected under 35 USC 102(b) as allegedly being anticipated by Tomatsu.

The Applicant respectfully submits that claim 18 is patentable over the cited reference at least because it recites, *inter alia*, "...a barrier region comprising a semiconductor region of the first conductivity type formed within the intermediate region, ***the barrier region being isolated from the deep region....***" (emphasis added)

The Applicant respectfully submits that claim 20 is patentable over the cited reference at least because it recites, *inter alia*, "...a plurality of barrier regions, ***each comprising a semiconductor region of the second conductive type*** and formed within the intermediate region" (emphasis added)

Certain embodiments of the present invention provide a semiconductor device comprising an electrode, a top region of a second conductivity type connected to the electrode, a deep region of the second conductivity type, and an intermediate region of a first conductivity type connected to the electrode. A portion of the intermediate region isolates the top region and the deep region. The semiconductor device further comprises a gate electrode facing the portion of the intermediate region via an insulating layer. The portion facing the gate electrode isolates the top region and the deep region. The intermediate region may comprise a dense portion directly connected to the electrode and a main portion connected to the electrode via the dense portion. The semiconductor device may further comprise a ***barrier region*** that is formed within the intermediate region and/or the top region. The barrier region may be formed by a semiconductor region of the first and/or second conductivity type. The barrier region can be ***electrically disconnected from the electrode and the deep region.*** For example, claim 18 requires that "...a barrier region comprising a semiconductor region of the first conductivity type formed within the intermediate region, ***the barrier region being isolated from the deep region....***" See paragraphs [0016], [0017], and [0019] of the instant application as published.

With respect to 18, Tomatsu describes a semiconductor device. The Office Action is equating the p type well region 13 (FIG. 2) of Tomatsu to the Applicant's barrier region. *See* page 3 of the Office Action. However, even if this analysis were correct, which the Applicant does not so admit, the p type well region 13 of Tomatsu extends into epitaxial layer 4, which the Office Action is equating to the Applicant's deep region. In contrast, in the invention of claim 18, the barrier region is *isolated from the deep region*.

Regarding claim 20, the Office Action is purporting to equate the p type well region 13 and p-type region 14 (FIG. 2) of Tomatsu to the Applicant's plurality of barrier regions. *See* page 3 of the Office Action. However, claim 20 requires that each [plurality of barrier regions] comprise a semiconductor region of the second conductivity type. Thus, this language identifies that each of the barrier regions is a second conductivity type so that the conductivity type of the barrier regions is different from the conductivity type of the intermediate region (i.e., first conductivity type). The Applicant respectfully submits that Tomatsu does not describe or suggest such a plurality of barrier regions.

Accordingly, it is respectfully submitted that Tomatsu does not teach and/or suggest each and every limitation of the inventions of claims 18 and 20. "A claim is anticipated only if *each and every element as set forth in the claim* is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Also, as discussed in MPEP 2143.01, obviousness can *only* be established by combining or modifying the *teachings of the prior art* to produce the claimed invention where there is some *teaching, suggestion, or motivation* to do so. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006) (discussing rationale underlying the motivation-suggestion-teaching *>test< as a guard against using hindsight in an obviousness analysis).

Further, as discussed in *KSR Int'l Co. v. Teleflex, et al.*, No. 04-1350, (U.S. Apr. 30, 2007), it remains necessary to identify the reason why a person of ordinary skill in the art would have been prompted to modify Tomatsu to include "*[a] barrier region being isolated from the deep region*" and "*a plurality of barrier regions, each comprising a semiconductor region of the second conductive type*" in the manner as recited in the inventions of claims 18 and 20. Obviousness cannot be sustained on mere conclusory statements.

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Thus, the Applicant respectfully submits that claims 18 and 20, as well as their dependent claims, are patentable over Tomatsu.

VI. Conclusion

In view of the above, the Applicant respectfully submits that the present application is in all aspects in allowable condition, and earnestly solicits favorable reconsideration and early issuance of a Notice of Allowance.

The Examiner is invited to contact the undersigned at (202) 220-4420 to discuss any matter concerning this application. The Office is authorized to charge any fees related to this communication to Deposit Account No. 11-0600.

Respectfully submitted,

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APPENDIX

FIG. 17